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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,370	08/28/2003	Stefan Scherer	2001DE313/D	7329

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CLARIANT CORPORATION  
INTELLECTUAL PROPERTY DEPARTMENT  
4000 MONROE ROAD  
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EXAMINER

VOLLANO, JEAN F

ART UNIT	PAPER NUMBER
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1621

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/650,370	SCHERER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Jean F. Vollano	1621	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 8-11, 13 and 14 is/are pending in the application.
- 4a) Of the above claim(s) 8-10 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 10/236,749.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/28/03</u> .   | 6) <input type="checkbox"/> Other: ____.                                    |

**DETAILED ACTION**

1. The election filed 3/23/2004 has been entered. Claims 1-7 and 12 have been canceled. Applicant has elected Group IV without traverse. Group IV is as follows “ IV. Claims 1 1-13 ( in part), drawn to a process for preparing boronic acids by a reaction that reacts the formed borane with an alkene group to form the alkylbis(allyl)borane (III) which is then oxidized with formaldehyde or glyoxal ( which forms formaldehyde in solution) to form the corresponding bisallyl alkylboronate The examiner notes that this product is not an a boronic acid. If this group is chosen then the boronic acid formation step must be include since the process is forming the boronic acid as the preparation states and the process ends before the acid is formed , the substituents cannot be heteroaryl groups This is classified as a non heterocyclic system, classified in class 562, 558, 568, subclass various. Also depending on the substituents the classes could also include 564, 562- sulfonic acid section, 560 among others depending on the substituent . Therefore if this group is chosen a species must be elected as a starting place for the search.”

The species that applicant has elected is not the end product when a formaldehyde or glyoxal is use as the oxidizing agent. The products formed using formaldehyde according to the specification are  $B-(O-R)_2$  wherein the OR is not cyclic. The specification states that the  $B(O-R-O)$  where the two oxygens are attached to the boron is formed when the oxidizing agent is diacetyl ( see page 6 paragraph [0021]. The product applicant has chosen will be only formed if the diacetyl is the oxidizing agent that was not the oxidizing agent chosen in the election. (see

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Group IV above). However to hasten prosecution the examiner will withdrawn the requirement of and election of a species from Group IV.

As written then Group IV being searched will be drawn to products which are oxidized by formaldehyde or glyoxal to give the final product which are not cyclic boronates but  $R(OR)_2$  which are mono dentates and not cyclic dentates. The elected group also has no heterorings for any of the R groups as stated in the process. The examiner notes that the boronic acid has been removed and the esters which are bis allyl alkylboronates are now being formed and each step need to form the boronates are present.

2. The examiner has performed the search and upon finishing finds that the search has covered also the reaction of the borane of compound I with compound II or IV to form a compound of III or V so if applicant would like the reaction has been expanded to include the reaction with IV to form V so this can be re-added to the elected group. However the examiner has only searched formaldehyde and glyoxal as the oxidizing agents to form the final boronate. Also per Group IV no heteocyclic R groups or heterocyclic products have been searched.

### *Priority*

3. The first sentence of the specification has been amended by a preliminary amendment to state "This application is a Divisional application of copending Application Serial No. 10/236,749 filed on September 6, 2002, the contents of which is hereby incorporated by reference." However part of the requirements for continuation is the present status of the application referred to in the sentence above. This application is now US

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6,706,925. This should be added to the priority information. The examiner use to do this but does not have a paper copy of this to attend to so it is applicant's responsibility to make sure the data is complete including the present status.

4. The examiner notes that the changes to the specification submitted in the amendment are correct. There was a obvious typographical error since the reaction with a triple bond would form an alkene and the reaction with a double bond would form an alkane.

***Claim Rejections - 35 USC § 112***

5. Claims 11 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: The process is for the formation of a bisallyl alkylboronate which has an oxygen bonded to the boron and then to a carbon of the allyl group. The intermediate is a compound of formula III the final product is formed by oxidizing the intermediated III with formaldehyde or glyoxal. One oxidant in the first part of the claim is one that forms the compound of formula I. This is not necessarily formaldehyde. There is no specific teaching for this oxidation (i.e. the oxidant) except in the first example wherein sodium borohydride, the diene and diglyme are reacted. In this scenario the diglyme (the solvent) appears to be the reagent that is has oxidation ability unless it is the air (i.e. oxygen) or is the

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(MeO)<sub>2</sub>SO<sub>2</sub> the oxidation agent ? There is certainly not formaldehyde, acetone, glyoxal or diacetyl ? The formaldehyde etc appears to be the oxidant for the next reaction which is taking the compound of formula III and reacting with the oxidizing agent formaldehyde or glyoxal to produce the corresponding bis allyl alkyl boronate or the bis allyl alkenyl boronate depending on whether a olefin or a acetylene was used. The species elected was after all a boronic acid ester even though it was not one of the compounds being prepared in the elected group. The step of taking III and oxidizing it with formaldehyde or glyoxal to form the corresponding bis allyl alkyl boronate as taught on page 6, paragraph 0021 is missing. Since it is the product and the step forming the product is missing and appears to be essential to the formation there is an essential step missing.

The examiner would like to point out that the claim was originally directed to making the boronic acids which would be apparently formed by hydrolysis of the boronate ester formed in the oxidation step with formaldehyde. Then the claim was changed to the formation of bis allyl alkyl boronate which would be an boronic acid ester. However the reaction seems to stop in the claim with the formation of the alkyl bis allyl borane ( not an ester) this is the product made from the compound of formula I and does not take any oxidation to form. The formula I is reacted with a olefin at the H-B site ( by the way there should only be one H on the boron not two). Is the second oxidation missing in the claim? The claim is so convoluted that it is unclear what oxidation is being referred to. The examiner searched the following reaction. A reaction of a diene with NaBH<sub>4</sub> in the presence of any oxidant to form the compound of formula I which then has then been reacted with a compound of formula II or IV to form a product of formula III or V which is then oxidized using formaldehyde or glyoxal to form the corresponding bis allyl

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alkyl boronate or the bis allyl alkenyl boronate. This is what the claim as rewritten seems to be claiming. The examiner has already not given a non responsive for changing the elected group from an acid product to an ester but now the whole claim is convoluted and it has taken much time to try to find out what applicant is claiming in the claim 11 process. The oxidant elected is not for the sodium borohydride reaction but for the oxidation step when the ester is formed. The examiner finds nothing in the specification which would include in the oxidation with  $\text{NaBH}_4$  the use of formaldehyde. If this is the case please support this with allegation with the lines in the specification which show that the oxidation with  $\text{Na BH}_4$  can be performed with formaldehyde. The examiner cannot find such support. Also what is your product? You went from an acid to an ester in your election and in your amended wording. However if there is only one oxidation the compounds of III and V may be what you tried to claim. The examiner searched the oxidation product of III and V as worded in the claim.

Claim 11 recites the limitation of a compound of ' formula I' in formula I there is a HC-R<sub>2</sub>R<sub>1</sub> portion of the molecule where the other sections of the molecule are just represented by conventional lines with no HC given. The formula prepared is (III) and there the HC has been replaced by another line drawing. Is there some significance to the HC in formula I which is then written in the conventional method in formula III ( the product)? Also formula I and formula III have parentheses which seem to only cover a section of the molecule if a portion of the molecule has a subscript of 2 then the all the parts that are contained in that subscript should be in the bracket to avoid confusion. The whole repeating unit should be in the bracket. This can be accomplished by using “ [ “ and having the bracket start at R<sub>4</sub> and end at R<sub>1</sub> and then start at R

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5 and end at R2 “ ] “ on the other side. And then having the 2 subscript be at the end of the ] such as H-B—[ formula of R1-R5]<sub>2</sub> . The examiner notes that there are too many Hs on the boron. Boron is a trivalent molecule and there are two ligands and **one hydrogen** not two unless the molecule is charged.

Claim 11 recites the limitation of “or two radicals R may be closed to form a cyclic system”. This is confusing as written as to what two radicals are forming a cyclic group. Is it any two R groups which can be anything or is it just two of the R groups from R1-R6? The wording does not limit the R groups to any R1-R6. Are the R groups different than R1-R6? What are the limits of the R radicals? What is meant by radicals? Does this mean the R groups must have an unpaired electron like in the term free radicals? Or is the claim trying to stated that optionally any two of R1-R6 may form a ring. This also is a little confusing since there are so many possible interactions? The phrase is confusing as to the metes and bounds of the structure.

Claim 11 recites “with and appropriate alkene (II)” . What is appropriate? The structure II is given and it is unclear what significance the word appropriate is giving to the claim. Does this mean that only some of the structures (II) can be used? If this is true then which are not appropriate? The claim is confusing as to the metes and bounds of what is being claimed.

Claim 11 recites the limitation “R9-R12 are selected from the group consisting of aryl , substituted or unsubstituted, alkyl-(C1-C8), branched and/or substituted alkyl –(C1-C8)...” The substituted or unsubstituted has commas around it and the commas are the only things used to separate the different R groups and could therefore be referring to the aryl or the alkyl groups which come after. If the claim is to optionally substituted aryl , optionally substituted and optionally branched alkyl (C1-C8) then that should clearly be stated. Claim 11 recites the



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limitation of Ophenyl which is confusing is that O-phenyl or is that a specific type or structure that has a name of ophenyl? The claim also recites "Nalkyl<sub>2</sub>(C1-C8) ... SO<sub>2</sub>N(alkyl-(C1-C8))<sub>2</sub>" The first example is confusing with the subscript after the alkyl and then followed by C1-C8. The second example is much clearer and the first example should be changed for consistency and for clarity to be like the second with the subscript at the end. The examiner will not make a rejection on the phrase "5-membered heteroaryl and 6-membered heteroaryl, where two radicals may also form a cyclic ring system which may contain heteroatoms" since this is part of the non elected subject matter (i.e. not heterocyclic ring systems) and will be removed when the non elected subject matter is moved from the claims.

The examiner notes that the oxidant of formaldehyde in claim 13 etc does not seem to refer to the term oxidant in claim 11 since the specification teaches that the oxidant for the reaction of sodium borohydride etc is a C1-C8 dialkylsulfate or C1-C8 alkylhalide see page 4 , paragraph 00012. If this is correct then there may be a scope of enablement if the oxidant is not part of the independent claim. The examiner does not know what the oxidant is according to the claim at the present and until this is clarified there cannot be such a rejection.

The examiner will comment on formula V since the examiner has searched sufficiently to include the reaction of I with IV to form V when the oxidizing agent is formaldehyde or glyoxal and would consider rejoining that limitation if it were re instated in the claim. The only comment on the formula V is again there is an HC-R1R2 which is inconsistent with the rest of the formulas. The examiner also notes that when the oxidant elected ( formaldehyde and glyoxal ) is place in the independent claim then claim 13 (when the non elected subject matter is removed) will be redundant unless the claim would read on one of the oxidants such as "wherein

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the oxidant used is formaldehyde” since the independent claim will be for both formaldehyde and glyoxal.

6. The examiner has searched the scenario listed above in the elected group and has not found art. The prior art teaches various ways to prepared boronic acid esters that are not cyclic as found in US 3,206,446 and US 3,133,951 . However due to the great confusion in what is being claimed and what exactly are the process steps being claimed the examiner will not comment on the novelty of the elected claims at this time.

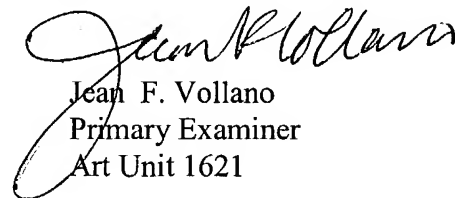
7. Applicant is asked to review the elected claims and rewrite them in a clear and concise manner pointing out the metes and bounds of the claims. It is noted that the elected species was an ester although the ester was cyclic and from a non elected group . Therefore the examiner examined the process for preparing the B(OR)<sub>2</sub> product which are esters from the elected group. Any additional changes to form different products will be considered a change in the invention and will not be entertained since a search has been performed on the elected invention. Please remove all non elected subject matter and cancel non elected claims. It would also be helpful to put in the two oxidation steps and to list the oxidants in the sodium borohydride step in the claim and then to list the two elected oxidants for the second oxidation in the claim for clarity and to avoid a 35 USC 112, first rejection for the first oxidant.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean F. Vollano whose telephone number is 571-2720648. The examiner can normally be reached on Monday-Thursday 6:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272- 0646. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jean F. Vollano  
Primary Examiner  
Art Unit 1621

April 11, 2004